Comment on an invisible Higgs boson and 50 GeV neutrino

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It has been recently suggested [1] that the fourth generation of leptons and quarks is not excluded by the precision Z boson measurements, provided that the mass of the fourth neutrino is around 50 GeV and that its mixing with the neutrinos of the first three generations is negligibly small.

We would like to note that in this case the decay rate of the Standard Model Higgs boson into the pair of such neutrinos would be about two orders of magnitude higher than than the $H \to b\bar{b}$ rate. Thus, the predominant decay mode of the Higgs would be invisible, which would require a special strategy for its searches, see, for example, [2].

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References

- M. Maltoni, V. A. Novikov, L. B. Okun, A. N. Rozanov and M. I. Vysotsky, Phys. Lett. B 476 (2000) 107 [hep-ph/9911535];
 - V. A. Ilyin, M. Maltoni, V. A. Novikov, L. B. Okun, A. N. Rozanov and M. I. Vysotsky, Phys. Lett. B **503** (2001) 126 [hep-ph/0006324].
- [2] O. J. Eboli and D. Zeppenfeld, Phys. Lett. B **495** (2000) 147 [hep-ph/0009158].